INCH-POUND
MIL-DTL-83505B
25 September 2001
SUPERSEDING
MIL-S-83505A
30 November 1987

DETAIL SPECIFICATION

SOCKETS, (LEAD, ELECTRONIC COMPONENTS)
GENERAL SPECIFICATION FOR

This specification is approved for use by all Departments
and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the general requirements for individual lead sockets for insertion through mounting boards or panels.

1.2 Classification.

1.2.1 Terminal types. Lead sockets have terminals of the following types, as specified (see 3.1 and figure 1).

Type I - Solderless wrap.

Type II - Printed circuit.

Type III - Solder wire turrent.

Type IV - Solder cup.

Type V - Other (see 3.1).

Type VI - Solderless spring contact (no terminal).

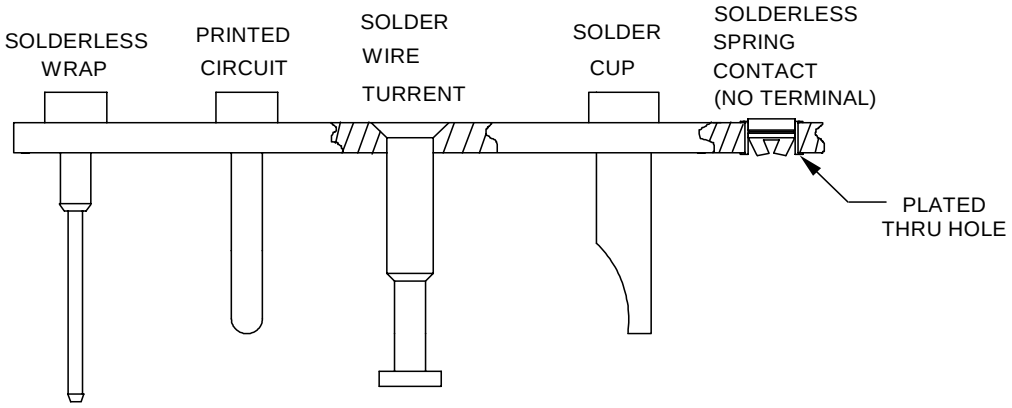


FIGURE 1. Terminal type configurations.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Defense Supply Center Columbus, ATTN: VAI, 3990 East Broad Street, Columbus, Ohio 43216-5000, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 5935

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirement documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

DEPARTMENT OF DEFENSE

MIL-DTL-83505/1	-	Sockets (lead, Electronic Components) (Type I, Solderless Wrap).
MIL-DTL-83505/2	-	Sockets (Lead, Electronic Components (Type II, Printed Circuit).
MIL-DTL-83505/6	-	Sockets (Lead, Electronic Components) (Type VI, Solderless Spring Contacts).
MIL-DTL-83734	-	Sockets, Plug-in Electronic Components, Dual-in-Line (DIPS) and Single-in-Line Packages (SIPS) General Specification For.

STANDARDS

DEPARTMENT OF DEFENSE

MIL-STD-202	-	Tests Methods for Electronic and Electrical Component Parts.
MIL-STD-1285	-	Marking of Electrical and Electronic Parts.
MIL-STD-1344	-	Test Methods for Electrical Connectors.

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Defense Printing Service Detachment Office Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.2.2 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DoDISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS are the issues of the documents cited in the solicitation (see 6.2).

AMERICAN NATIONAL STANDARDS INSTITUTE, INC.

ANSI B46.1-78	-	Surface Roughness, Waviness and Lay.
ANSI Y14.5-1973	-	Dimensioning and Tolerancing for Engineering Drawings.
ANSI/NCSL Z540-1-1994	-	Calibration Laboratories and Measuring and Test Equipment, General Requirements.

(Application for copies should be addressed to the American National Standards Institute, Inc. 1430 Broadway, New York, NY 10017.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM B16	-	Rod, Bar, and Shapes for use in Screw Machines, Free Cutting Brass.
ASTM B139	-	Rod, Phosphor Bronze, Bar, and Shapes.
ASTM B194	-	Plate, Copper Beryllium Alloy, Sheet, Strip, and Rolled Bar.
ASTM B196	-	Rod and Bar, Copper Beryllium Alloy.
ASTM B488	-	Standard Specification for Electrodeposited Coatings of Gold for Engineering Uses.
ASTM B740	-	Copper-Nickel-Tin Spinodal Alloy Strip.

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

COPPER DEVELOPMENT ASSOCIATION (CDA)

Copper Alloy No. CA 11000

(Application for copies should be addressed to the Copper Development Association Inc. 405 Lexington Avenue, New York, NY 10017.)

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO-10012-1 - Quality Assurance Requirement for Measuring Equipment.

(Applications for copies should be addressed to the International Organization for Standardization, i,rue de Varembe, Case postale 56, CH-1211 Geneve 20, Switzerland.)

SOCIETY OF AUTOMOTIVE ENGINEERS INC. (SAE)

AMS-QQ-N-290 - Nickel Plating (Electrodeposited).
AMS-QQ-P-81728 - Plating, Tin-Lead (Electrodeposited).

(Application for copies should be addressed to the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096-0001.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related associated specifications or specification sheets), the text of this document takes precedence. Nothing in this document however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Specification sheets. The individual item requirements shall be as specified herein and in accordance with the applicable specification sheet. In the event of any conflict between the requirements of this specification and the specification sheet, the latter shall govern.

3.1.1 Reference critical interface materials, plating, and processes. The identified reference critical interface materials, plating, and processes have been established to provide assurances that sockets manufactured to this specification will properly interface to similar industry standards or government specified component interconnection systems without problems of electrochemical contamination of critical electrical or mechanical interfaces or generation of incompatible mechanical interface surface wear products. The manufacturers of sockets supplied to this specification are allowed to use alternate recognized industry standards for materials, plating, and processes from those identified in 3.3 of this specification. Alternate materials, plating, and processes used must be coordinated with the qualifying activity as part of the qualification process. Use of alternates to those referenced guidance items by the supplier must not result in inferior short or long term performance or reliability of supplied sockets as compared with sockets manufactured using the referenced materials, plating, or processes. Short or long term failures or reliability problems due to use of these alternates shall be the responsibility of the supplier.

3.2 Quality.

3.2.1 Qualification. Sockets furnished under this specification shall be products that are authorized by the qualifying activity for listing on the applicable qualified products list before contract award (see 4.5 and 6.4).

3.3 Materials. Example reference materials are identified herein. However, when an example reference material is not identified, a material shall be used which will enable the sockets and accessories to meet the performance requirements of this specification. Acceptance or approval of a constituent material shall not be construed as a guaranty of acceptance of the finished product.

3.3.1 Recycled, recovered, or environmentally preferable material. Recycled, recovered, or environmentally preferable material should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements and promotes economically advantageous life cycle costs.

3.3.2 Electrical contact gold guidelines. Electrical contact gold plating shall be in accordance with ASTM B488, type 2, code C,.000030 (0.00076 mm) inch minimum thickness on the contact mating surface. Silver shall not be used as an underplate.

3.3.3 Socket (including termination). See figure 2.

3.3.3.1 Spring contact. The spring contact portion of the socket shall be beryllium copper in accordance ASTM B139, ASTM B194, ASTM B196, copper-tin-nickel spinodial alloy C72900 in accordance with ASTM B740.

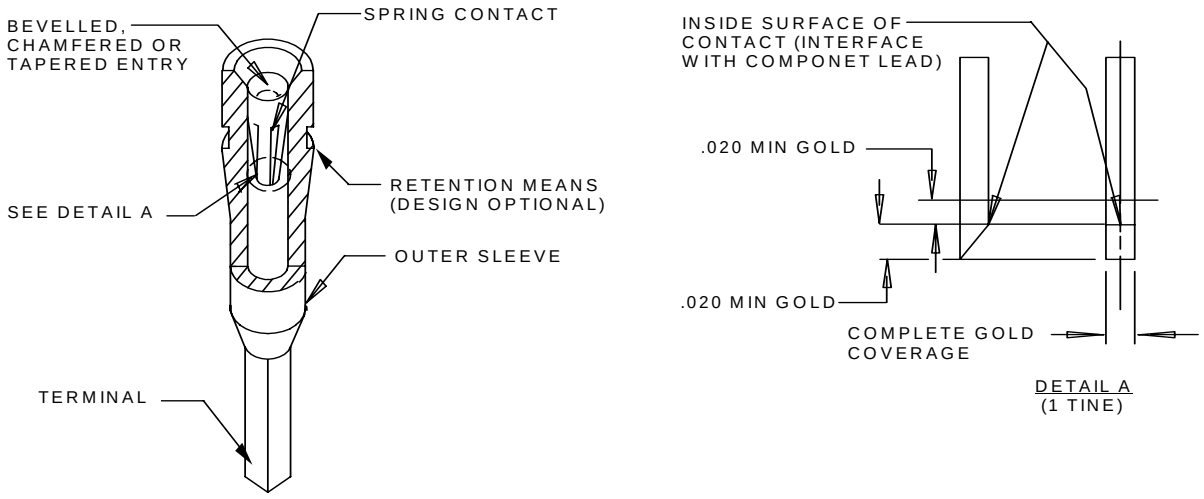


FIGURE 2. General configuration.

3.3.3.2 Spring contact finish. The spring contact finish shall be gold in accordance with ASTM B488, type 2, code C, class 0.76 (30 microinch) minimum thickness. Finish shall be applied over a nickel, in accordance with AMS-QQ-N-290, underplate thickness 30 - 150 microinch (0.76 - 3.81 µm). The spring contact finish shall be applied overall or localized (see 3.3). When contacts are provided in strip form, the absence of plating in the area where the contact was removed from the strip is acceptable, provided it is a non-functional area and any corrosion formed as a result of salt spray testing does not creep into the contact engaging area. When a localized finish is used the finish and underplate shall be as specified above but the location of the finish shall conform to detail A of figure 2 (see 3.1 and 3.3.2).

3.3.3.3 Outer sleeve (including termination). The sleeve and termination portion of the socket shall be made of brass in accordance with ASTM B16 or copper in accordance with Copper Development Association Alloy C11000.

3.3.3.4 Outer sleeve (including termination) finish. The finish for the sleeve shall be one of the following as specified (see 3.1).

a Gold plating shall be in accordance with ASTM B 488, type 2, code C, class 0.51 (20 microinch) minimum thickness, over nickel, in accordance with QQ-N-290, thickness 30 - 150 microinches (0.76 - 3.81 µm) (see 3.3).

b. Tin-lead in accordance with AMS-P-81728, minimum thickness of 180 microinches (4.57 µm) over nickel, in accordance with AMS-QQ-N-290, thickness of 30 -150 microinches (0.76 - 3.81 µm), or copper. For printed circuit termination's (type II), the tin-lead finish shall be 50 to 70 percent tin; for all other termination's, the tin-lead finish shall be 5 percent minimum lead. For tin-lead finished copper sleeves, nickel or copper underplate is not required (see 3.3).

3.4 Design and construction. Sockets shall be of the design, construction, and physical dimensions specified (see 3.1). The entry to the socket shall be beveled, chamfered or tapered to facilitate the engagement of the component lead into the socket, except type VI socket. The lead socket sleeve and terminal shall be of machined one-piece construction. The material shall be brass in accordance with ASTM B16. The body shall provide a means of retention to a mounting board as specified (see 3.1) and figure 2.

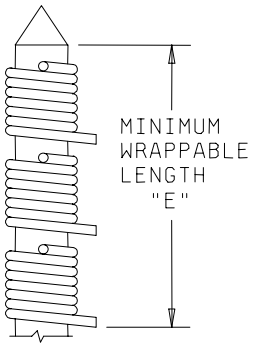
3.4.1 Temperature rating. Part or Identifying Number (PIN) applicable to tin finishes shall have a temperature rating of -40°C to +105°C. Unless otherwise specified (see 3.1) PIN's applicable to gold finish (plating or inlay) contact engagement area shall have a temperature rating of -55°C to +125°C.

3.4.2 Wire termination. Unless otherwise specified wire terminations shall conform to figure 1 and shall be as specified (see 3.1).

3.4.2.1 Solderable terminals. Terminals intended for soldering shall be designed so that there shall be no solder wicking into the lead engagement chamber.

3.4.2.2 Solderless wrappost geometry (type I). The solderless geometry shall be in accordance with figures 3 and 4.

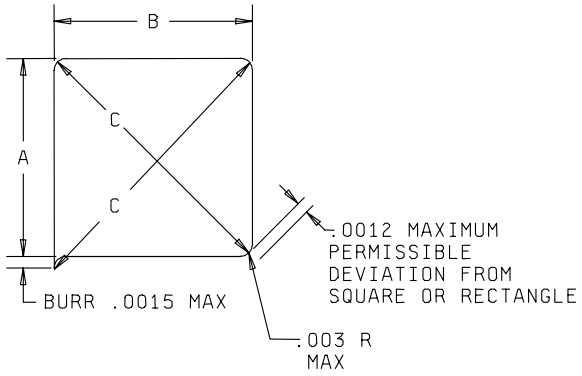
3.4.2.2.1 Tip configuration. The tip of the wrappost shall terminate in a radius or bevel to facilitate insertion into the wrapping tool. If the tip of the wrappost terminates in a bevel, the apex of the bevel shall be flat, with no side of the flat exceeding .015 inch (0.38 mm) on a .025 inch (0.63 mm) square and .020 inch (0.51 mm) on a .045 inch (1.14 mm) and .06 inch X .03 inch (1.52 mm X 0.76 mm) rectangular.



Number of wrapped connections	E length						
	Wire gage 30 (mm)	Wire gage 28 (mm)	Wire gage 26 (mm)	Wire gage 24 (mm)	Wire gage 22 (mm)	Wire gage 20 (mm)	Wire gage 18 (mm)
1	.185 (4.70)	.219 (5.56)	.226 (5.74)	.258 (6.55)	.303 (7.69)	.327 (8.31)	.391 (9.93)
2	.320 (8.13)	.388 (9.85)	.402 (10.21)	.466 (11.83)	.556 (14.12)	.604 (15.34)	.732 (18.59)
3	.455 (11.56)	.557 (14.15)	.578 (14.68)	.674 (14.43)	.809 (20.55)	.881 (22.37)	1.073 (27.25)

FIGURE 3. Wrappable length.

3.4.2.2.2 Parallelism. See figure 4 and associated table.



Inches	mm
.0012	0.030
.0015	0.038
.003	0.38

Wrappost geometry

A (mm)	B (mm)	C (mm)	Parallelism (mm)	Straightness Inch/inch (mm)
.025 (0.63) nominal .022 (0.56) min	.025 (0.63) nominal .022 (0.56) min	.0355 (0.902) max .0325 (0.825) min	.002 (0.05) .002 (0.05)	.005 (0.13) .005 (0.13)

FIGURE 4. Diagonal dimension.

3.5 Performance.

3.5.1 Insertion force. The maximum insertion force shall be as specified (see 3.1 and 4.6.3). There shall be no damage to the contact retention member nor shall the contact retention member be displaced from its original location during this test.

3.5.2 Withdrawal force. The spring contact within the socket shall hold the test pin with the .5 ounce (14.2 g) minimum withdrawal force applied (see 4.6.4).

3.5.3 Socket contact retention (for type I through IV). There shall be no damage or loosening of the socket from the mounting board after the socket retention test (see 4.6.5).

3.5.3.1 Solderless spring contact printed wiring board (pwb) retention (type VI). There shall be no separation or loosening of the contact from the test board after the solderless spring contact pwb retention (see 4.6.5.1).

3.5.4 Low-signal level contact resistance circuit. The socket shall show no electrical discontinuity and the contact resistance requirement shall not be exceeded the values specified in table I (see 4.6.6).

TABLE I. Contact resistance (milliohms).

Initial	After 50 cycles	After corrosive atmosphere
15.0 max	30.0 max	30.0 max

3.5.5 Terminal strength (type I only). Testing of terminals shall not result in damaging of the terminal or the socket contact (see 4.6.7.1 and 4.6.7.2).

3.5.6 Vibration. During vibration, there shall be no interruption in continuity greater than 1 microsecond of the test circuit, which incorporates, mated contacts. There shall be no physical or mechanical damage to the mounted socket contacts. After the test, the sockets shall meet the low-signal level contact resistance requirements of 3.5.4 (see 4.6.8). For type VI solderless spring contacts M83505/6 a printed circuit board shall be used while following the mounting information on the slash sheet.

3.5.7 Mechanical shock. During the test there shall be no interruption in continuity greater than 1 microsecond of the test circuit that incorporates mated contacts. There shall be no physical damage to the socket (see 4.6.9). For type VI solderless spring contacts M83505/6 a printed circuit board shall be used while following the mounting information on the slash sheet.

3.5.8 Socket durability (see 4.6.10). After 50 insertions and removals, sockets shall show no evidence of cracking or breaking. The socket shall meet the low-signal level contact resistance circuit requirement of 3.5.4 and the contact withdrawal force requirement of 3.5.2. Note. The maximum test gage shall be used for the cycling and a minimum gage shall be used for the final measurements.

3.5.9 Thermal shock. There shall be no evidence of physical damage to the socket. The socket shall be capable of being mated with the maximum test gage without damage to the socket or the gage (see 4.6.11).

3.5.10 Corrosive atmosphere. There shall be no evidence of porous plating or exposure of base metal on the contacting surfaces and the low-signal level contact resistance requirement of 3.5.4 shall not be exceeded (see 4.6.12 and 6.7.1).

3.5.11 Solderability (except type I and VI terminals). Terminations shall withstand the test (see 4.6.13).

3.5.12 Resistance to soldering heat (except type I and VI terminals). Sockets shall withstand the test without damage. There shall be no solder wicking into the lead engagement area (see 4.6.14). After the test sockets shall meet the withdrawal force requirement of 3.5.2 and the spring contact retention requirement of 3.5.13.

3.5.13 Spring contact retention. During testing, the spring contact shall not separate from the socket sleeve (see 4.6.15).

3.6 Marking. Sockets shall be marked in accordance with method I of MIL-STD-1285, and shall include the military PIN (see 3.1), the manufacturer's name or code symbol, and date code.

3.7 Workmanship. Sockets shall be free from burrs, crazing, cracks, voids, pimples, chips, blisters, pinholes and sharp cutting edges, except type I solderless wrap requires sharp edges on terminal, and other defects that will adversely affect life, serviceability, or appearance.

4. VERIFICATION

4.1 Classification of inspection. The inspection requirements specified herein are classified as follows:

a. Qualification inspection (see 4.2).

b. Materials inspection (see 4.3).

c. Conformance inspection (see 4.5).

4.2 Qualification inspection. Qualification inspection shall be performed at a laboratory acceptable to the Government (see 6.3) on sample units produced with equipment and procedures normally used in production. Use of alternate materials, plating, and processes (see 3.1.1) shall be identified for inclusion in the product test documentation.

4.2.1 Verification testing. The following identified tests and test methods assure socket integrity within typical operating conditions and applications. Alternate commercial industry standard test methods are allowed, however when an alternate method is used, the alternate method must be coordinated with the qualifying activity prior to performance of the test. The test methods described herein are proven methods and shall be the referee method in cases of dispute.

4.2.2 Test equipment and inspection facilities. Test and measuring equipment and inspection facilities of sufficient accuracy, quality and quantity to permit performance of the required inspection shall be established and maintained by the contractor. The establishment and maintenance of a calibration system to control the accuracy of the measuring and test equipment (i.e. ANSI/NCSL Z540-1-1994, ISO 10012-1 part 1, or comparable standards) shall be required.

4.3 Materials inspection. Materials inspection shall consist of certification supported by verifying data that the materials, as specified by example, in table I, and on the specification sheets (see 3.1), used in fabricating the sockets, are in accordance with the applicable referenced specifications or requirements prior to such fabrication (see 3.4 and 4.6.2).

4.4 Inspection conditions. Unless otherwise specified herein, all inspections shall be performed in accordance with the test conditions specified in the "GENERAL REQUIREMENTS" of MIL-STD-1344 and MIL-STD-202.

4.4.1 Sample size.

4.4.1.1 Single submission. Thirty-two type I and VI sockets or sixty-four sockets (type II through V) shall be subjected to qualification inspection.

4.4.1.2 Inspection routine. The sample shall be subjected to the inspections specified in table II, in the order shown. All sample units shall be subjected to the inspections of group I. The samples shall be divided as follows and subjected to the inspections for their particular group:

a. Two (2) groups of 16 units for type I and VI sockets.
b. Four (4) groups of 16 units each type II through V sockets.

4.4.1.3 Reduced testing criteria. Manufacturers that qualify MIL-DTL-83734 sockets “style A” are only required to perform visual and mechanical examination and group II tests in table II of MIL-DTL-83505 to be listed in QPL-83505. Conversely MIL-DTL-83505/1 or /2 qualified sockets shall be exempt from performing specified tests in groups I and III, and table II group A inspection, except for visual and mechanical examination of MIL-DTL-83734.

TABLE II. Qualification inspection.

Inspection	Requirement paragraph	Method paragraph
Group I		
Visual and mechanical examination 1/	3.1, 3.3, 3.4, 3.6, and 3.7	4.6.2
Tip configuration (type I only) 1/	3.4.2.2.1	
Parallelism (type I only) 1/	3.4.2.2.2	
Insertion force	3.5.1	4.6.3
Withdrawal force	3.5.2	4.6.4
Socket retention (type I through IV)	3.5.3	4.6.5
Spring contact pwb retention (type VI only)	3.5.3.1	4.6.5.1
Low-signal level contact resistance	3.5.4	4.6.6
Group II		
Terminal strength (type I only)	3.5.5	4.6.7
Vibration	3.5.6	4.6.8
Low-signal level contact resistance	3.5.4	4.6.6
Withdrawal force	3.5.2	4.6.4
Mechanical shock	3.5.7	4.6.9
Socket durability	3.5.8	4.6.10
Low-signal level contact resistance	3.5.4	4.6.6
Withdrawal force	3.5.2	4.6.4
Thermal shock	3.5.9	4.6.11
Spring contact retention	3.5.13	4.6.15
Group III		
Corrosive atmosphere	3.5.10	4.6.12
Low-signal level contact resistance	3.5.4	4.6.6
Group IV 2/		
Solderability	3.5.11	4.6.13
Visual and mechanical examination	3.1, 3.3, 3.4, 3.6, and 3.7	4.6.2
Group V 2/		
Resistance to soldering heat	3.5.12	4.6.14
Spring contact retention	3.5.13	4.6.15
Visual and mechanical examination	3.1, 3.3, 3.4, 3.6, and 3.7	4.6.2
Withdrawal force	3.5.2	4.6.4

1/ Four randomly selected units shall be measured for dimensional acceptability. If all pass, no further dimensional testing is required. If any unacceptable values are recorded, the entire sample must be examined for dimensional compliance.
2/ Except type I and VI terminals.

4.4.2 Failures. One or more failures shall be cause for refusal to grant qualification approval.

4.4.3 Retention of qualification. To retain qualification, the contractor shall verify in coordination with the qualifying activity the capability of manufacturing products, which meet the performance requirements of this specification. Refer to the qualifying activity for the guidelines necessary to retain qualification to this particular specification. The contractor shall immediately notify the qualifying activity at any time that the inspection data indicates failure of the qualified product to meet the performance requirements of this specification.

4.5 Conformance inspection.

4.5.1 Inspection of product for delivery. Inspection of product for delivery shall consist of group A inspection. Except as specified in 4.5.2.1.2, delivery of products which have passed the group A inspection shall not be delayed pending the results of group B inspection.

4.5.1.1 Inspection lot. An inspection lot, as far as practicable, shall consist of all sockets of the same configuration produced under essentially the same conditions, and offered for inspection at one time.

4.5.1.2 Group A inspection. Group A inspection shall consist of the inspections specified in table III, on the same set of sample units in the order shown.

TABLE III. Group A inspection.

Inspection	Requirement paragraph	Method paragraph
Visual and mechanical inspection	3.1, 3.3, 3.4, 3.6, and 3.7	4.6.2
Insertion force	3.5.1	4.6.3
Withdrawal force	3.5.2	4.6.4

4.5.1.2.1 Sampling plan (group A). Table III tests shall be performed on a production lot basis. Samples shall be selected in accordance with table IV. If one or more defects are found, the lot shall be screened for that particular defect and defects removed. A new sample of parts shall be selected in accordance with table IV and all group A tests again performed. If one or more defects are found in the second sample, the lot shall be rejected and shall not be supplied to this specification.

TABLE IV. Lot and sample size.

Lot size	Sample size
1 to 50	5
51 to 90	7
91 to 150	11
151 to 280	13
281 to 500	16
501 to 1200	19
1201 to 3200	23
3201 to 10000	29
10001 to	35

4.5.1.2.2 Disposition of sample units. Sample units which have passed all the group A inspections may be delivered on the contract if the lot is accepted and the sample units are still within the specification tolerances.

4.5.2 Periodic inspection. Periodic inspection shall consist of group B. Except where the results of these inspections show noncompliance with the applicable requirements (see 4.5.2.1.2), delivery of products which have passed group A inspection shall not be delayed pending the results of these periodic inspections.

4.5.2.1 Group B inspection. Group B inspection shall consist of the tests specified in table II, in the order shown. Group B inspection shall be made on sample units selected from inspection lots, which have passed the group A inspection.

4.5.2.1.1 Sampling plan.

4.5.2.1.2 Single submission. Eight (8) sample sockets (type I through IV) or 4 (type VI) sockets from those covered by a single specification sheet shall be selected at random from items produced every 36 months.

4.5.2.1.3 Inspection routine. The sample shall be subjected to the inspections specified in table I, in the order shown. All sample units shall be subjected to the inspections of group I. The samples shall be divided as follows and subjected to the inspections for their particular group.

a. 2 groups of 2 units for type I and VI sockets.
b. 4 groups of 2 units for type II through V sockets.

4.5.2.1.4 Noncompliance. If a sample fails to pass group B inspection, the contractor shall take corrective action on the materials or processes, or both, as warranted, and on all units of product which can be corrected and which were manufactured under essentially the same conditions, with essentially the same materials, processes, etc., and which are considered subject to the same failure. Acceptance of the product shall be discontinued until corrective action, acceptable to the Government, has been taken. After the corrective action has been taken, group B inspection shall be repeated on additional sample units (all inspection, or the inspection, which the original sample failed, at the option of the Government). Group A inspections may be reinstituted; however, final acceptance shall be withheld until the group B reinspection has shown that the corrective action was successful. In the event of failure after reinspection, information concerning the failure and corrective action shall be made available to the cognizant inspection activity and to the qualifying activity.

4.6 Methods of inspection.

4.6.1 Test methods. The following identified tests and test methods assure socket integrity within typical operating conditions and applications. Alternate commercial or industry standard test methods are allowed, however when and alternate method is used, the qualifying activity must be notified prior to performance of the test. The test methods described herein are proven methods and shall be the referee method in cases of dispute.

4.6.2 Visual and mechanical inspection. Sockets shall be examined to verify that the dimensions, materials, design construction, marking, and workmanship are in accordance with the applicable requirements (see 3.1, 3.3, 3.4, 3.6, and 3.7).

4.6.3 Insertion force (see 3.5.1). The initial force required to fully insert the test gage and withdrawal the maximum diameter test gage (see figure 3) shall be measured. The test restrictions are as follows:

a. The vertical axis of the test gage shall coincide with the vertical axis of the socket.

b. The test gage shall travel along the vertical axis of the socket.

c. The speed of insertion of the test gage into the socket contacts shall not exceed 2 inches (50.80 mm) per minute for consistent-speed machines, or the rate of loading shall not exceed 80 pounds (36.29 kg) per minute for contact-rate-of-force machines.

d. Scale mechanism shall have no dashpots or other damping devices.

e. Scales shall be calibrated in .125 pound (0.06 kg) steps or less, and shall be accurate to within ±5 percent.

4.6.4 Withdrawal force (see 3.5.2). After two withdrawals of the maximum diameter insertion and withdrawal force test gages (see figure 5), the individual unmating force shall be measured using the minimum diameter test gage. The test gage shall be inserted to the depth specified (see 3.1) and the withdrawal force of .5 ozf (14.17 gram) minimum shall be applied to the test gage. The test restrictions are as follows:

a. The vertical axis of the test gage shall coincide with the vertical axis of the socket.

b. The test gage shall travel along the vertical axis of the socket.

c. The speed of insertion of the test gage into the socket contacts shall not exceed 2 inches (50.80 mm) per minute for consistent-speed machines, or the rate of loading shall not exceed 80 pounds (36.29 kg) per minute for contact-rate-of-force machines.

d. Scale mechanism shall have no dashpots or other damping devices.

e. Scales shall be calibrated in .125 pound (0.06 kg) steps or less, and shall be accurate to within ±5 percent.

4.6.5 Socket retention (type I through IV) (see 3.5.3). With the socket mounted in an appropriate fixture, a 7.5 pound (3.40 kg) axial load shall be applied to terminals intended for solderless wrap applications. A 7.5-pound (3.40 kg) axial load shall be applied in both directions to terminals intended for solder applications. There shall be no damage or loosening of the socket from the mounting board.

4.6.5.1 Solderless spring contact pwb retention (type VI) (see 3.5.3.1). With a solderless spring contact mounted in a test pwb a 4-pound (1.81 kg) axial load shall be applied in both directions to the terminal (see 3.5.3.1).

4.6.6 Low-signal level contact resistance (see 3.5.4) (see figures 6 and 7). The low-signal level contact resistance test procedure shall be in accordance with method 3002 of MIL-STD-1344. The following details shall apply:

a. All samples in the test group shall be measured.

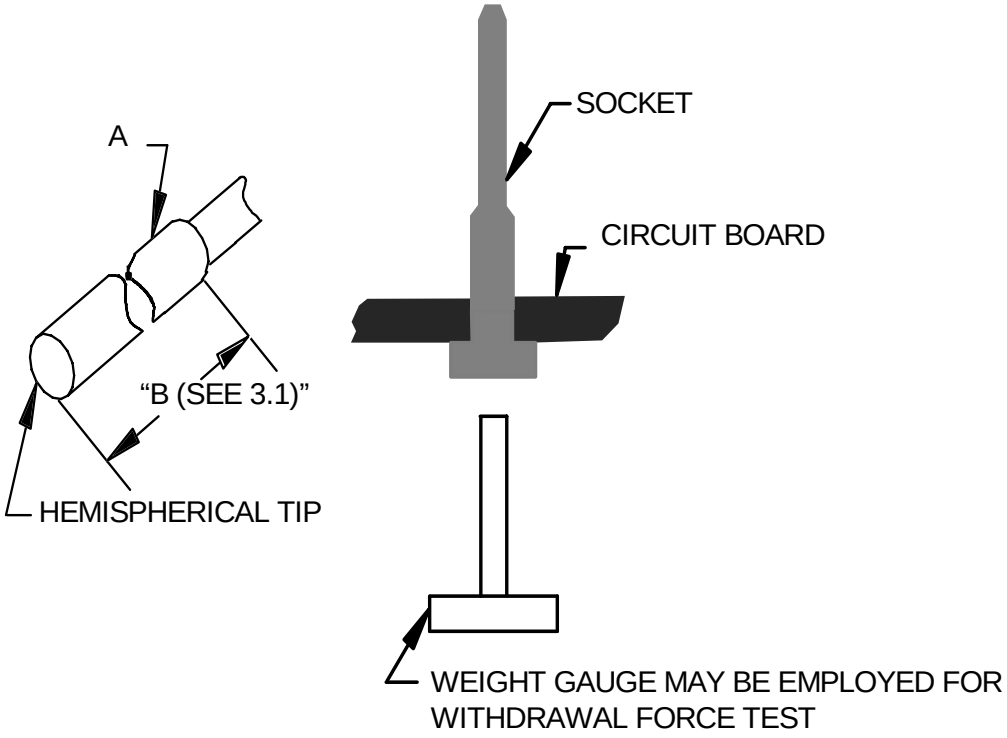
b. Brass or copper base alloy gage.

c. Plating of the test gage and socket spring contact to be the same general materials.

d. Minimum size test gage shall be used (see figure 5).

e. Environmental conditioning not required.

f. One measurement in each direction, and then record the average of the two readings.



For acceptable socket mating lead dia (mm)	Use gage A dia (mm)	
	Min +.0002 (0.005) -.0000	Max +.0000 -.0002 (0.005)
.016 to .021 (0.41 to 0.53)	.0160 (0.406)	.0210 (0.533)
.021 - .030 (0.53 - 0.76)	.0210 (0.533)	.0300 (0.762)
.030 - .040 (0.76 - 1.02)	.0300 (0.762)	.0400 (1.016)
.040 - .050 (1.02 - 1.27)	.0400 (1.016)	.0500 (1.270)
.017 - .019 (0.43 - 0.48)	.0170 (0.432)	.0190 (0.483)
.018 - .020 (0.46 - 0.51)	.0180 (0.457)	.0200 (0.508)
.030 - .033 (0.76 - 0.84)	.0300 (0.762)	.0330 (0.838)

NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Material: Carbon steel, finish 16 microinches (0.41 μm) maximum.

FIGURE 5. Mating and unmating test gages.

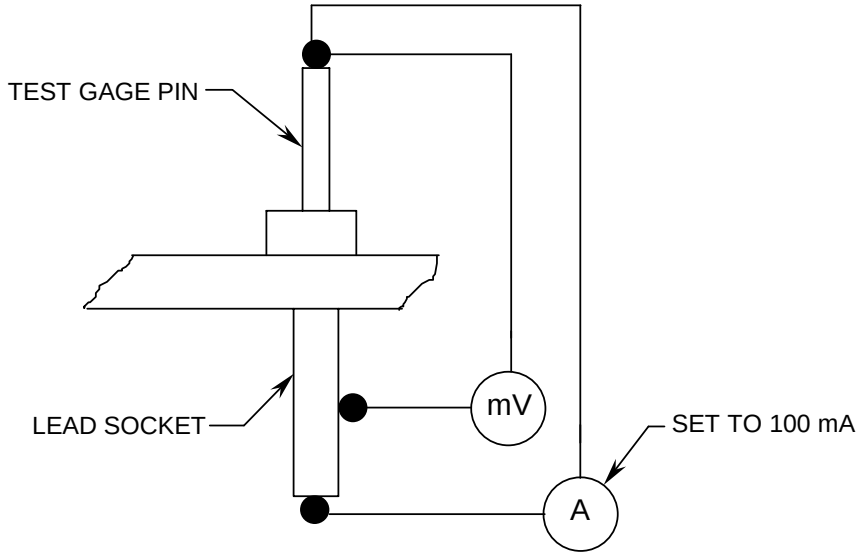


FIGURE 6. Low-signal level contact resistance type I through type V sockets.

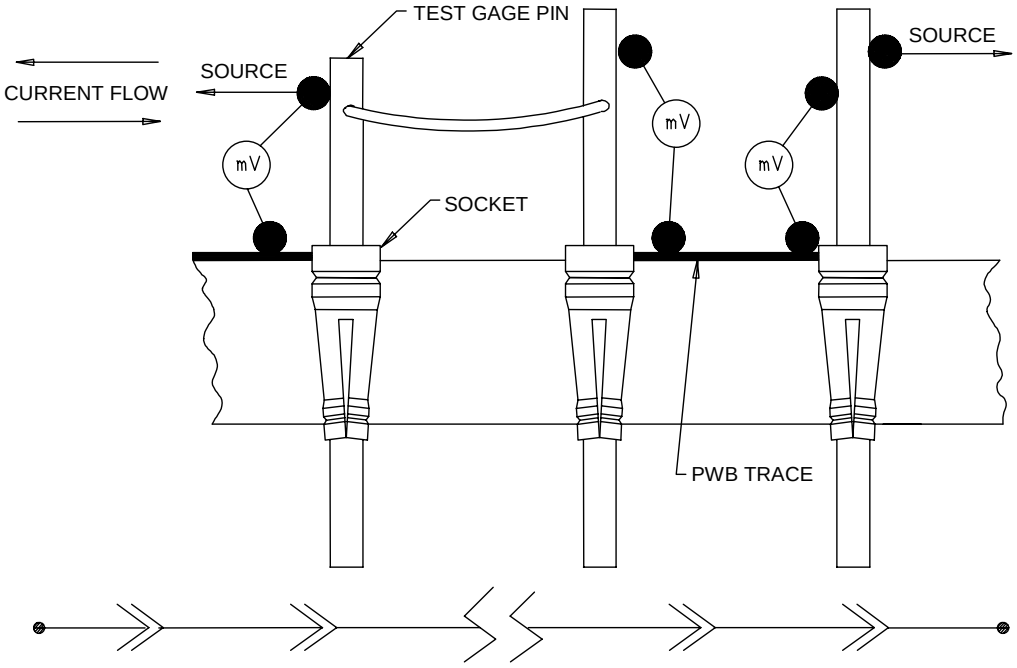


FIGURE 7. Low-signal level contact resistance, vibration and mechanical shock test setup type VI sockets.

4.6.7 Terminal strength (see 3.5.5).

4.6.7.1 Bend test (type I only). The socket shall be secured to the mounting board by its normal means and then tested in accordance with method 211, test condition C, of MIL-STD-202, with a test load of 1 pound (453.6 grams) minimum. The bend shall be only 30° each side of center.

4.6.7.2 Torque test (type I only). Sockets shall be tested in accordance with method 211, test condition E, of MIL-STD-202, with 2 ozf in (14.12 mN m) torque.

4.6.8 Vibration (see 3.5.6) (see figures 7 and 8). Sockets shall be tested in accordance with method 2005 of MIL-STD-1344, the following details shall apply:

a. Test condition: III.

b. Preparation: Mated with a dummy test circuit (see figure 7 for setup).

c. At the conclusion of the test, the low-signal level contact resistance circuit shall be measured in accordance with 4.6.6 and the contact withdrawal force shall be measured in accordance with 4.6.4.

d. Low-signal level contact resistance shall not exceed 30 milliohms.

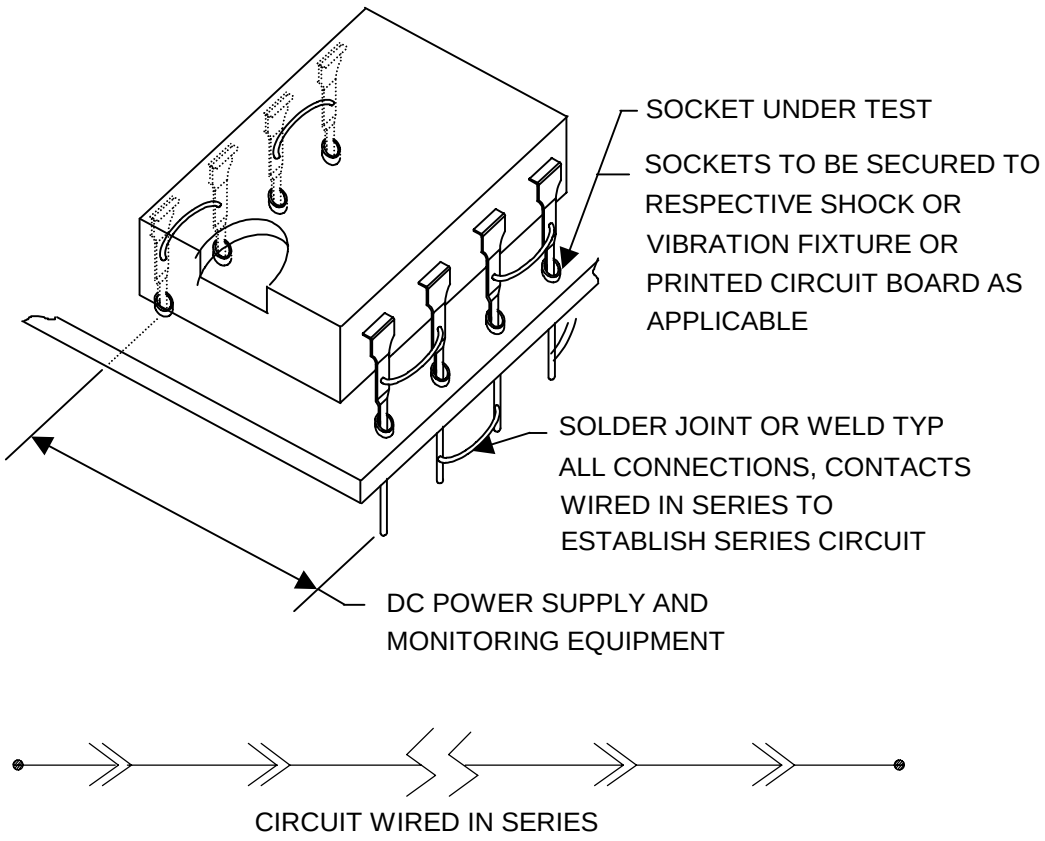


FIGURE 8. Vibration and mechanical shock test setup type I through V socket.

4.6.9 Mechanical shock (see 3.5.7) (see figures 7 and 8). The socket shall be tested in accordance with method 2004 of MIL-STD-1344. The following details shall apply:

a. Mounting method and accessories: Mounted by normal means and suitable monitoring circuit to detect any interruption greater than 1 microsecond.

b. Test condition letter: G.

c. Number of blows: One blow in both directions along each of three mutually perpendicular axes for a total of six shocks.

d. Preparation: Mated with a dummy test circuit (see figure 7 for setup).

4.6.10 Socket durability (see 3.5.8). Each unit shall be subjected to 50 mating and unmating cycles using the maximum test gage (see figure 5). At the conclusion of the test, the low-signal level contact resistance shall be measured in accordance with 4.6.6 and the contact withdrawal force shall be measured in accordance with 4.6.4.

4.6.11 Thermal shock (see 3.5.9). Sockets shall be tested in accordance with method 1003 of MIL-STD-1344. The following details shall apply:

a. For gold contacts: -55°C to +125°C.

b. For tin/lead contact: -40°C to +105°C.

c. Test measurement: The sockets shall be capable of mating and unmating at the temperature extremes (force shall be unmonitored) during the fifth cycle, without damage to either component.

4.6.12 Corrosive atmosphere (see 3.5.10 and 6.7.1). Mated sockets shall be exposed to a concentrated sulfur atmosphere. The following details shall apply:

a. Sockets that have been mated with the same minimum gage is used as required for low-signal level contact resistance and preconditioned by being subjected to two unmonitored insertions of the insertion force gage (see figure 3). The sockets shall be exposed to a 10-25 PPM solution of ammonium polysulfide at a relative humidity of 60 percent or higher at room temperature for 4 hours in an enclosed chamber.

b. At the conclusion of the sulfur atmosphere exposure, the low-signal level contact resistance of the undisturbed mated socket shall be measured in accordance with 4.6.6.

4.6.13 Solderability (except type I and VI terminals) (see 3.5.11). Each terminal shall be subjected to method 208 of MIL-STD-202.

4.6.14 Resistance to soldering heat (except type I and VI terminals) (see 3.5.12). Sockets shall be tested in accordance with method 210 of MIL-STD-202. The following details shall apply:

a. Special preparation of specimens: Samples shall be suitably masked to prevent solder from entering the socket. The board shall be wave or float soldered.

b. Depth of immersion in the molten solder: Sockets shall be immersed to the bottom of the mounting board or panel.

c. Test condition letter: E.

d. Measurements after test: Sockets shall be subjected to the withdrawal force and spring contact retention tests of 4.6.4 and 4.6.15, respectively.

4.6.15 Spring contact retention (see 3.5.13). A 7.5 lbf (31.14 Newton) axial force shall be applied against the spring tines, with the socket mounted in an appropriate fixture. The direction of the force shall be away from the panel. The termination portion of the socket sleeve may be removed to permit application of the force.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When the actual packaging of material is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature, which may be helpful, but is not mandatory.)

6.1 The sockets covered by this specification are military unique because they must be able to operate satisfactory under random vibration, 100 g's of shock, and temperatures ranging from - 55 to + 125°C. Commercial electronic components are not designed to withstand such extreme and sudden environmental conditions and would experience catastrophic failure.

6.2 Intended use. All sockets covered by this specification are intended for application in electronic and electrical circuits under conditions that are not in excess of the ratings established herein (see 3.1), for the particular socket. Only plug-in component leads with similar finishes to the mating socket contacts should be mated reference MIL-HDBK-454. Sockets for use with microcircuits in aerospace and other severe vibration environments may require the approval of the Special Program Office (SPO). Where application of sockets covered by this specification is contemplated for conditions in excess of those stated above, it is advisable that approval of the cognizant bureau or service be obtained.

6.3 Acquisition requirements. Acquisition documents must specify the following:

a. Title, number and date of this specification.

b. Title, number and date of the applicable specification sheet, and the complete PIN (see 3.1).

c. Issue of DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1 and 2.2.1).

d. Packaging requirements (see 5.1).

6.4 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in the applicable qualified products list whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or purchase orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from Defense Supply Center Columbus, ATTN: DSCC-VQP, 3990 East Broad Street, Columbus, Ohio 43216-5000.

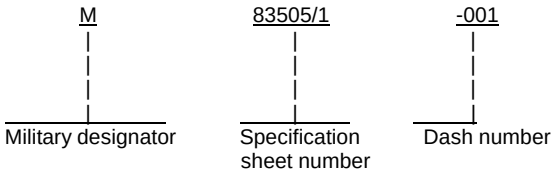
6.4.1 Provisions governing qualification. Copies of "Provisions Governing Qualifications" may be obtained upon application to Standardization Document Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

6.5 Environmentally preferable material. Environmentally preferable materials should be used to the maximum extent possible that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs. Table XVII lists the Environmental Protection Agency (EPA) top seventeen hazardous materials targeted for major usage reduction. If any of these hazardous materials are required, it is recommended that it be used only when other materials cannot meet performance requirements.

TABLE XVII. EPA top seventeen hazardous materials.

Benzene	Dichloromethane	Tetrachloroethylene
Cadmium and compounds	Lead and compounds	Toluene
Carbon Tetrachloride	Mercury and compounds	1,1,1 - Trichloroethane
Chloroform	Methyl Ethyl compounds	Trichloroethylene
Chromium and compounds	Methyl Isobutyl Ketone	Xylenes
Cyanide and compounds	Nickel and compounds	

6.6 PIN. PIN is a new term encompassing previous terms used in specification such as part number, type designator, identification numbers etc.

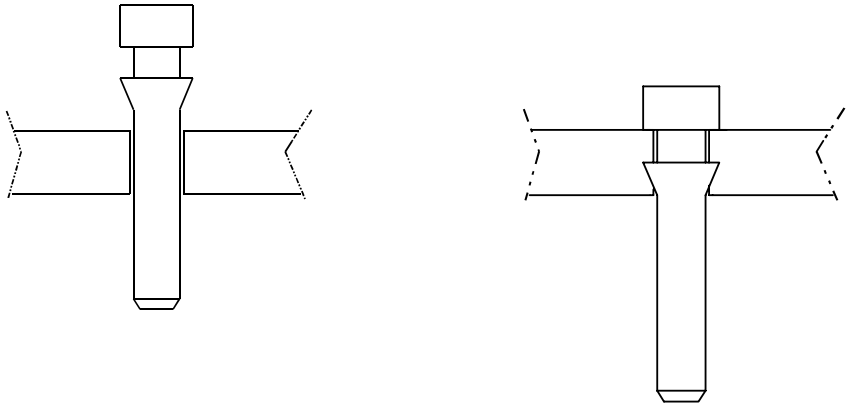


6.7 Definitions.

6.7.1 Corrosive atmosphere. The corrosive atmosphere test is intended to reveal imperfections in the plated contacting surfaces such as pores, scratches, or incomplete plating coverage. It will also reveal defects such as low contact pressure. However, it is not intended to correlate directly with long term atmospheric information (see 3.5.10).

6.8 Dimensions. Dimensions are in inches. Metric equivalents (to the nearest .01 mm) are given for general information only.

6.9 Installation. Unless otherwise specified (see 3.1), sockets are to be installed as shown on figure 9.



STEP 1
Drop lead socket into recommended hole

STEP 2
Press until seated with flat tool

FIGURE 9. Installation.

6.10 Subject term (key word) listing.
Beryllium
Copper
Nickel
Wrappost

6.11 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

CONCLUDING MATERIAL

Custodians:
Army - CR
Navy - EC
Air Force - 11
DLA - CC

Review activity:
Air Force - 99

Preparing activity:
DLA - CC

(Project 5935-4326)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7, and send to preparing activity.
3 The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER MIL-DTL-83505B	2. DOCUMENT DATE *(YYYYMMDD)* 20010925

3. DOCUMENT TITLE

SOCKETS, (LEAD, ELECTRONIC COMPONENTS) GENERAL SPECIFICATION FOR

4. NATURE OF CHANGE *(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)*

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME *(Last, First, Middle Initial)*	b. ORGANIZATION	
c. ADDRESS *(Include zip code)*	d. TELEPHONE *(Include Area Code)* (1) Commercial (2) DSN *(if applicable)*	7. DATE SUBMITTED *(YYYYMMDD)*

8. PREPARING ACTIVITY

a. NAME **Defense Logistics Agency** **Defense Supply Center, Columbus**	b. TELEPHONE *(Include Area Code)* (1) Commercial **614-692-0538** (2) DSN **850-0538**
c. ADDRESS *(Include Zip Code)* **DSCC-VAI** **P.O. Box 3990** **Columbus, Ohio 43216-5000**	**IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:** **Defense Standardization Program Office (DLSC-LM)** **8725 John J. Kingman Road,Suite 2533** **Fort Belvoir, Virginia 22060-6621** **Telephone (703) 767-6888 DSN 427-6888**